WE CLAIM:

1. A hybrid nucleic acid molecule comprising a first nucleic acid sequence encoding a signal sequence of a lipoprotein other than PsaA and a second nucleic acid sequence encoding a mature PsaA protein, or fragment thereof, wherein the signal sequence of the lipoprotein is contiguous with the second nucleic acid sequence.

2. The hybrid nucleic acid molecule of claim 1, wherein the signal sequence is the signal sequence of an OspA protein of a *Borrelia* species.

3. The hybrid nucleic acid molecule of claim 2 wherein the first nucleic acid sequence and the second nucleic acid sequence are coupled in a translational open reading frame relationship.

4. An expression vector containing the hybrid nucleic acid molecule of claim 1 operatively linked to a promoter for expression of the mature PsaA protein.

5. A method of preparation of recombinant lipidated PsaA protein, which method comprises: introducing the expression vector of claim 4 into a host organism; and effecting expression of the mature PsaA protein from the host organism.

6. The method of claim 5 wherein the host organism is *E.coli*.

7. A process for the production of recombinant lipidated PsaA protein, which process comprises: constructing a hybrid nucleic acid molecule comprising a first nucleic acid sequence encoding a signal sequence of a Borrelia lipoprotein and a second nucleic acid sequence encoding a mature PsaA protein, or fragment thereof, wherein the signal sequence of the Borrelia lipoprotein is contiguous with the second nucleic acid sequence; forming an expression vector containing the hybrid nucleic acid molecule operatively linked to a promoter for expression of the mature protein; introducing the expression vector into a host organism; effecting expression of the recombinant lipidated PsaA protein by the host organism; lysing the cells of the host organism;

treating the lysed cells with a surfactant which selectively solubilizes the recombinant lipoprotein in preferennce to bacterial and other proteins and which is able to effect phase separation of a detergent phase under mild conditions; effecting phase separation at a detergent phase containing solubilized recombinant lipidated PsaA protein, an aqueous phase containing bacterial and other proteins and a solid phase containing cell residue; separating and recovering the detergent phase from the solid phase and the aqueous phase; contacting the detergent phase with a first chromatographic column under conditions which result in binding of protein other than the recombinant lipidated PsaA protein to the column to provide a flow-through containing lipidated PsaA protein from the first chromatographic column and recovering the flow-through from the first chromatographic column; contacting the flow-through from the first chromatographic column with a second chromatographic column under conditions which result in binding of the recombinant lipidated PsaA protein in preference to contaminant proteins and lipopolysaccharides which flow through the second chromatographic column; eluting the recombinant lipidated PsaA protein from the second chromatographic column to provide an eluant substantially free from lipopolysaccharides and contaminant proteins; and recovering the eluant.

8. The process of claim 7 wherein the surfactant is TRITON™ X-114.

9. The process of claim 8 wherein the treating of lysed cells is effected at a temperature of about 0 °C to about 10 °C, the resulting mixture is treated to a mildly elevated temperature of about 35 °C to about 40 °C to effect separation of the detergent phase, and the detergent phase is separated from the aqueous phase by centrifugation.

10. The process of claim 7 wherein the first chromatographic column is an ion exchange column.

11. The process of claim 7 wherein lysis of the host cells is effected by freeze-thaw.

12. The process of claim 7 wherein lysis of the host cells is effected by sonication.

13. Recombinantly produced, isolated and purified lipidated PsaA protein produced by the process of claim 7.

14. Recombinantly produced, isolated and purified lipidated PsaA protein having a purity of at least 80% and substantially free from contaminant proteins and lipopolysaccharides.

15. The recombinantly produced, lipidated PsaA protein of claim 14, wherein said protein has a purity of at least 95%.

16. An immunological composition comprising the recombinant lipidated PsaA protein of claim 15.

17. The immunological composition of claim 16, further comprising an adjuvant.

18. The immunological composition of claim 17, wherein the adjuvant is alum.

19. A method of inducing an immunological response in an animal comprising the step of administering to the animal the immunological composition of claim 16.

20. A method of immunizing a host against pneumococcal infection, which method comprises administering to the host an immunologically effective amount of recombinantly produced, lipidated PsaA.

21. The method of claim 20, wherein said administration is effected intranasally.

22. An immunogenic composition for intranasal administration to a host susceptible to pneumococcal carriage to elicit a protective immunological response against colonization with *Streptococcus pneumoniae* in the nasopharnyx, which comprises an immunizing amount of recombinant lipidated PsaA, or an immunogenic fragment thereof

23. The composition of claim 22, further comprising an adjuvant.

24. The composition of claim 23, wherein the adjuvant is alum.